

Amendments to the Claims

Claim 1 (Currently Amended) A device comprising:

~~a sensor platform having a planar optical waveguide, as part of a sensor platform, and connected to said platform directly or by means of a sealing medium; and~~

~~a sealing layer (g) (according to Figure 1), said layer forming, either directly a tight seal or with a by means of the sealing medium, a tight seal with said planar optical waveguide tightly sealing layer, said device comprising, said sealing layer having a plurality multitude of recesses opening at least at least open towards said the sensor platform, each of said recesses forming which form a corresponding multitude of sample compartments in a 2-dimensional arrangement, wherein~~

~~in each of said sample compartments has different biological or biochemical recognition elements, for the specific recognition and binding of different analytes, are immobilized in five or more discrete measurement areas (d) (according to Figure 1) in a two-dimensional array on said planar optical waveguide in these sample compartments, wherein~~

~~said measurement areas are in optical interaction with the excitation light emanating from said optical waveguide, as part of said a sensor platform which forms a demarcation of said sample compartments, wherein and~~

~~said sample compartments are adapted such that operable to be cleared from received sample or reagent solutions received therein are removable therefrom and to receive, in the following, optionally without washing steps, further sample or reagent solutions are receivable therein, which are supplied to the same said sample compartments.~~

Claim 2 (Currently Amended) A device according to claim 1, wherein ~~at least one of said measurement areas, in each of said the sample compartments is, out of the five or more measurement areas in a single sample compartment, one or more measurement areas are used for referencing.~~

Claim 3 (Currently Amended) A device according to claim 2, wherein ~~said referencing measurement areas reference for referencing the same chemical or optical parameters are used in a number of said several sample compartments distributed over said the sensor platform,~~

whereby also that the lateral distribution of the said chemical or optical parameters over said the
sensor platform is can be determined.

Claim 4 (Currently Amended) A device according to claim 1, wherein said measurement areas are in optical interaction with an the evanescent field of the excitation light guided in said planar optical waveguide.

Claim 5 (Currently Amended) A device according to claim 1, wherein said planar the optical waveguide, as part of the sensor platform, is a multi-mode or single-mode waveguide comprising an anorganic material, preferably glass, or an organic material that is, preferably a plastic, which is preferably selected from the group comprising polymethylmethacrylate, polycarbonate or polystyrene, which materials are optically transparent at least at an the excitation wavelength and a luminescence wavelength.

Claim 6 (Currently Amended) A device according to claim 1, wherein the said planar optical waveguide, as part of the sensor platform, is self-supporting.

Claim 7 (Currently Amended) A device according to claim 1, wherein said planer the optical film waveguide, as part of the sensor platform, waveguide is an optical film waveguide having with a first optically transparent layer (a) (according to Figure 1) and a second optically transparent layer, said first optically transparent layer being on said a second optically transparent layer (b) (according to Figure 1) with and said second optically transparent layer having a lower refractive index than said first optically transparent layer (a).

Claim 8 (Currently Amended) A device according to claim 7, wherein said the material of the second optically transparent layer (b) comprises glass, quartz, or transparent thermoplastic plastics, preferably of the group comprising polycarbonate, polyimide, or polymethylmethacrylate, or polystyrene.

Claim 9 (Currently Amended) A device according to claim 7, wherein the refractive index of said the first optically transparent layer (a) is higher than 1.8.

Claim 10 (Currently Amended) A device according to claim 7-, wherein said the first optically transparent layer-(a) comprises TiO₂, ZnO, Nb₂O₅, Ta₂O₅, HfO₂, or ZrO₂, preferably Ta₂O₅ or Nb₂O₅.

Claim 11 (Currently Amended) A device according to claim 7, wherein a the thickness of said the first optically transparent layer-(a) is between 40 and 300 nm, preferably between 100 and 200 nm.

Claim 12 (Currently Amended) A device according to claim 7, wherein said optical film waveguide further has an additional optically transparent layer-(b') (according to Figure 1) in contact with said first optically transparent layer and having a lower refractive index than said first optically transparent and in contact with layer-(a), said additional optically transparent layer having and with a thickness of 5 nm -10 000 10,000 nm, preferably of 10 nm -1000 nm, is and being located between said first and second the optically transparent layers-(a) and -(b).

Claim 13 (Currently Amended) A device according to claim 12, wherein said additional optically transparent layer reduces the purpose of the intermediate layer is a reduction of the surface roughness below said first optically transparent layer-(a), reduces or a reduction of the penetration of an the evanescent field, of light guided in said first optically transparent layer-(a), into the one or more layers located below said first optically transparent layer, improves or an improvement of the adhesion of said first optically transparent layer-(a) to the one or more layers located below said first optically transparent layer, reduces or a reduction of thermally induced stress within said the optical sensor platform, or provides a chemical isolation of said first the optically transparent layer-(a) from layers located below, by sealing of micro pores in said first optically transparent layer-(a) against the layers located below.

Claim 14 (Currently Amended) A device according to claim 7, further comprising wherein an adhesion-promoting layer-(f) is deposited on said first the optically transparent layer-(a), for immobilizing the immobilization of biological, or biochemical or synthetic recognition elements.

Claim 15 (Currently Amended) A device according to claim 14, wherein said—the adhesion-promoting layer—(f), has a thickness of less than 200 nm, preferably of less than 20 nm.

Claim 16 (Currently Amended) A device according to claim 14—, wherein said—the adhesion-promoting layer comprises chemical compounds of a—the group consisting of comprising silanes, epoxides, and "self-organized functionalized monolayers".

Claim 17 (Currently Amended) A device according to claim 1, wherein said laterally separated measurement areas—(d) are generated by laterally selective deposition of biological,—or biochemical or synthetic recognition elements on said sensor platform.

Claim 18 (Currently Amended) A device according to claim 17, wherein said measurement areas are deposited by one or more methods of a—the group consisting of methods comprising ink jet spotting, mechanical spotting by means of pin or pen, micro contact printing, fluidic contacting of said—the measurement areas with the biological,—or biochemical or synthetic recognition elements upon their supply in parallel or crossed micro channels, upon application of pressure differences or of electric or electromagnetic potentials, are applied for the deposition of the biological or biochemical or synthetic recognition elements.

Claim 19 (Currently Amended) A device according to claim 17, wherein, as the biological,—or biochemical or synthetic recognition elements, components of a—the group consisting of comprising nucleic acids (DNA, RNA), antibodies, aptamers, membrane-bound and isolated receptors, their ligands of the membrane-bound and isolated receptors, antigens for antibodies, histidin-tag components—ohistidin-tag components—, cavities generated by chemical synthesis, for hosting molecular imprints. etc., are deposited.

Claim 20 (Currently Amended) A device according to claim 17, wherein whole cells or cell fragments are deposited as the biological,—or biochemical or synthetic recognition elements.

Claim 21 (Currently Amended) A device according to claim 17, wherein compounds, which are "chemically neutral" towards the analytes analyte, are deposited between said the laterally separated measurement areas (d), in order to minimize nonspecific binding or adsorption.

Claim 22 (Currently Amended) A device according to claim 21, wherein the said compounds, which are chemically neutral ~~chemically neutral~~ towards the analyte analyte, are selected from the groups comprising, for example, albumines such as bovine serum albumin, herring sperm, or polyethyleneglycols.

Claim 23 (Currently Amended) A device according to claim 7, wherein said first optically transparent layer has at least one ~~the incoupling of excitation light to the measurement areas (d)~~ is performed by means of one or more grating structure structures (c) (according to Figure 1), which are formed therein for incoupling excitation light to said measurement areas in the optically transparent layer (a).

Claim 24 (Currently Amended) A device according to claim 7, wherein said first optically transparent layer has at least one grating structure formed therein for the outcoupling of light guided in said first ~~the optically transparent layer (a)~~ is performed by means of grating structures (c') (according to Figure 1), which are formed in the optically transparent layer (a).

Claim 25 (Currently Amended) A device according to claim 23, wherein said first optically transparent layer also has at least one grating structure formed therein for the outcoupling of light guided in said first ~~the optically transparent layer (a)~~ is performed by means of grating structures (c') (according to Figure 1), which are formed in the optically transparent layer (a), and wherein grating structures (c) and (c') formed in the optically transparent layer (a) have the same or different periodicity and are arranged in parallel or not in parallel to each other.

Claim 26 (Currently Amended) A device according to claim 25, wherein said incoupling and outcoupling grating structures are interchangeable with respect to incoupling and outcoupling (c) and (c') can interchangeably be used as incoupling and / or outcoupling gratings.

Claim 27 (Currently Amended) A device according to claim 25-7, wherein said incoupling and outcoupling the grating structures-(e) and optional additional grating structures-(e') have a period of 200 nm - 1000 nm and a grating modulation depth of 3 nm - 100 nm, preferably of 10 nm - 30 nm.

Claim 28 (Currently Amended) A device according to claim 27, wherein a the ratio of the grating modulation depth to a the thickness of said the first optically transparent layer-(a) is equal or smaller than 0.2.

Claim 29 (Currently Amended) A device according to claim 23-7, wherein said the grating structure -(e) is (a) a relief grating with a rectangular rightangular, triangular or semi-circular profile or (b) a phase or volume grating with a periodic modulation of a the refractive index in said first the essentially planar optically transparent layer-(a).

Claim 30 (Currently Amended) A device according to claim 7, further comprising wherein a thin metal layer, preferably of gold or silver, optionally on an additional dielectric layer of lower refractive index than layer (a), for example of silica or magnesium fluoride, is deposited between said first the optically transparent layer-(a) and the immobilized biological or biochemical recognition elements, wherein a the thickness of said thin the metal layer and the optional, additional intermediate layer is selected in such a way, such that a surface plasmon at at least one of an the excitation wavelength and a and / or at the luminescence wavelength is excitable can be excited.

Claim 31 (Currently Amended) A device according to claim 23-7, wherein said the grating structure-(e) is a diffractive grating with a uniform period.

Claim 32 (Currently Amended) A device according to claim 23-7, wherein said the grating structure-(e) is a multi-diffractive grating.

Claim 33 (Currently Amended) A device according to claim 25–23, wherein said incoupling and outcoupling grating structures (e) and optional additional grating structures (e') are located outside a the region of said the sample compartments.

Claim 34 (Currently Amended) A device according to claim 25–23, wherein said incoupling and outcoupling grating structures (e) and optional additional grating structures (e') extend over at least a portion of said the range of multiple or all sample compartments.

Claim 35 (Currently Amended) A device according to claim 23, wherein a portion of said the material of the tightly sealing layer (g) in contact with the sensor platform, in the incumbant surface area, is optically transparent both for the excitation radiation and the excited luminescence radiation at least within a the penetration depth of an the evanescent field.

Claim 36 (Currently Amended) A device according to claim 35, wherein said sealing the layer comprises a (g) is provided in form of a two layer system, the first layer of which, to be brought into that is in contact with a the surface of said the sensor platform, said first layer being transparent for the excitation radiation and the excited luminescence radiation, and a second layer whereas the adjacent layer, being that is located more remote from said the sensor platform, said second layer being is absorbent in a the spectral range of the excitation radiation and of the excited luminescence radiation.

Claim 37 (Currently Amended) A device according to claim 34, wherein said the material of the tightly sealing layer (g) in contact with the sensor platform is absorbent in a the spectral range of the excitation radiation and of the excited luminescence radiation.

Claim 38 (Currently Amended) A device according to claim 1, wherein said the material of the tightly sealing layer (g) in contact with the sensor platform is self-adhesive.

Claim 39 (Currently Amended) A device according to claim 1, wherein said the material of the tightly sealing layer (g) in contact with the sensor platform comprises a polysiloxane.

Claim 40 (Currently Amended) A device according to claim 1, wherein 5 - 1000, preferably 10 - 400 of said measurement areas are located in one of said sample compartments compartment.

Claim 41 (Currently Amended) A device according to claim 1, wherein an individual one of said measurement areas area in said-a sample compartments compartment occupies an area of 0.001 - 6 mm², and wherein different measurement areas can have similar or different sizes-size.

Claim 42 (Currently Amended) A device according to claim 1, wherein each of said the sample compartments has have a volume of 100 nl - 1 ml each.

Claim 43 (Currently Amended) A device according to claim 1, wherein said, at the side facing away from the optically transparent layer (a), the sample compartments are closed at a side facing away from said sensor platform except for inlet and outlet openings for the supply and/or removal, respectively, of samples and optional additional reagents, and wherein the supply and/or removal of the samples and optional additional reagents is performed in a closed flow-through system, and wherein in case of when liquid is supplied supply to said measurement areas or segments with common inlet and outlet openings, said inlet and outlet openings are preferably addressed row by row or column by column.

Claim 44 (Currently Amended) A device according to claim 1, wherein the supply of the samples and optional additional reagents is performed in parallel or crossed micro channels, affected by pressure differences or by electric or by electromagnetic potentials.

Claim 45 (Currently Amended) A device according to claim 1, wherein said the sample compartments have openings for the locally addressed supply or removal of samples or other reagents reagents at a the side facing away from said sensor platform the optically transparent layer (a).

Claim 46 (Currently Amended) A device according to claim 1, wherein compartments are provided for reagents, which are wetted and brought into contact with said the measurement areas during an the assay.

Claim 47 (Currently Amended) A device according to claim 1, wherein said sensor platform has optically or mechanically recognizable marks ~~are provided thereon~~ ~~on the sensor platform, the optically or mechanically recognizable marks at least one of facilitating in order to facilitate the adjustment of said sensor platform in an optical system and facilitating and / or to facilitate the combination of said the sensor platform with said sealing the layer having said (g) comprising the recesses for said the sample compartments.~~

Claim 48 (Withdrawn - Currently Amended) An analytical system for the determination of one or more luminescences, the analytical system comprising:

- a. at least one excitation light source;
- b. a device according to claim 1; and
- c. at least one detector for recording the emission light emanating from the at least one of said or more measurement areas (d) on said the sensor platform.

Claim 49 (Withdrawn - Currently Amended) An analytical system according to claim 48, wherein said planar the optical film waveguide, as part of the sensor platform, is an optical film waveguide having with a first optically transparent layer (a) (according to Figure 1) and a second optically transparent layer, said first optically transparent layer being on said a second optically transparent layer (b) (according to Figure 1) with and said second optically transparent layer having a lower refractive index than said first optically transparent layer, and wherein the excitation light emitted by said the at least one excitation light source is coherent and directed onto the one or more of said measurement areas at a the resonance angle for incoupling into said first the optically transparent layer (a).

Claim 50 (Withdrawn - Currently Amended) An analytical system according to claim 49, further comprising expansion optics, wherein said expansion optics expand the excitation light of said at least one light source is expanded to an essentially parallel ray bundle by an expansion optics and direct the essentially parallel ray bundle directed onto said the one or more measurement areas at the resonance angle for incoupling into said first the optically transparent layer (a).

Claim 51 (Withdrawn - Currently Amended) An analytical system according to claim 49, further comprising at least one diffractive optical element, wherein said at least one diffractive optical element divides the excitation light from said at least one light source is deviated, by means of one or, in case of several light sources, by means of multiple diffractive optical elements, preferably Dammann gratings, or refractive optical elements, preferably micro-lens arrays, into a multitude of individual beams having with as similar intensities intensity as possible of the individual beams originating from a common light source, the which individual beams being are directed essentially in parallel to each other onto laterally separated measurement areas.

Claim 52 (Withdrawn - Currently Amended) An analytical system according to claim 49, wherein said at least one excitation light source is at least two or more coherent light sources with equal or different emission wavelength are used as excitation light sources.

Claim 53 (Withdrawn - Currently Amended) An analytical system according to claim 48, wherein said at least one detector is a at least one laterally resolving detector is used for detection.

Claim 54 (Withdrawn - Currently Amended) An analytical system according to claim 53, wherein said laterally resolving detector is a at least one detector from the group formed by CCD camera-cameras, a CCD chip-chips, a photodiode array-arrays, an Avalanche diode array-arrays, a multi-channel plate-plates, or a-and multi-channel photomultiplier photomultipliers is used as the at least one laterally resolving detector.

Claim 55 (Withdrawn - Currently Amended) An analytical system according to claim 48, further comprising wherein optical components located at least one of between said excitation light source and said detector and said sensor platform and said detector, said optical components including at least two of the group comprising (a) lenses or lens systems for the shaping of the transmitted light bundles, (b) planar or curved mirrors for the deviation and optionally additional shaping of the transmitted light bundles, (c) prisms for the deviation and optionally spectral

separation of the transmitted light bundles, (d) dichroic mirrors for the spectrally selective deviation of parts of the transmitted light bundles, (e) neutral density filters for the regulation of the transmitted light intensity, (f) optical filters or monochromators for the spectrally selective transmission of parts of the transmitted light bundles, and (g)-or polarization selective elements for the selection of discrete polarization directions of the excitation light or luminescence light are located between the one or more excitation light sources and the sensor platform and / or between said sensor platform and the one or more detectors.

Claim 56 (Withdrawn - Currently Amended) An analytical system according to claim 48, wherein said excitation light source emits the excitation light ~~is launched in pulses with a duration of 1 fsec to 10 min.~~

Claim 57 (Withdrawn - Currently Amended) An analytical system according to claim 48-, wherein the emission light from said at least one the measurement area ~~areas~~ is measured time-resolved.

Claim 58 (Withdrawn - Currently Amended) An analytical system according to claim 48, wherein ~~for referencing purposes~~ light signals of the group comprising the excitation light at a the location of said excitation the light source ~~sources~~ or, the excitation light after expansion, the excitation light ~~of the excitation light~~ or after its multiplexing into individual beams, scattered light at an the excitation wavelength from a the location of the one or more laterally separated measurement areas, or and light of the excitation wavelength outcoupled by a the grating structure ~~structures~~ (e) or (e') are measured for reference.

Claim 59 (Withdrawn - Currently Amended) An analytical system according to claim 58, wherein said the measurement areas for determination of the emission light and of the reference light signals ~~signal~~ are identical.

Claim 60 (Withdrawn - Currently Amended) An analytical system according to claim 48, wherein launching of the excitation light and detection of the emission light from said at least

one ~~the one or more measurement area~~ areas is performed sequentially for one or more of said sample compartments.

Claim 61 (Withdrawn - Currently Amended) An analytical system according to claim 60, further comprising movable optical components for performing ~~wherein the~~ sequential excitation and detection ~~is performed using movable optical components, said movable optical components including at least two of the group comprising~~ mirrors, deviating prisms, and dichroic mirrors.

Claim 62 (Withdrawn - Currently Amended) An analytical system according to claim 61, further comprising an essentially focus and angle preserving scanner for performing ~~wherein the~~ sequential excitation and detection ~~is performed using an essentially focus and angle preserving scanner.~~

Claim 63 (Withdrawn - Currently Amended) An analytical system according to claim 60, wherein said the sensor platform is moved between steps of sequential excitation and detection.

Claims 64-80 (Canceled)

Claim 81 (Currently Amended) A device according to claim 7, wherein said laterally separated measurement areas ~~(d)~~ are generated by laterally selective deposition of biological, or biochemical or synthetic recognition elements on said sensor platform.

Claim 82 (Currently Amended) A device according to claim 7, wherein said the material of the tightly sealing layer ~~(g) in contact with the sensor platform~~ is self-adhesive.

Claim 83 (Currently Amended) A device according to claim 7, wherein said the material of the tightly sealing layer ~~(g) in contact with the sensor platform~~ comprises a polysiloxane.

Claim 84 (Currently Amended) A device according to claim 7, wherein 5 - 1000, preferably 10 - 400 of said measurement areas are located in one of said sample compartments-compartment.

Claim 85 (Currently Amended) A device according to claim 7, wherein an individual one of said measurement areas ~~area in said sample compartments~~ occupies an area of 0.001 - 6 mm², and wherein different measurement areas can have similar or different sizes ~~size~~.

Claim 86 (Currently Amended) A device according to claim 7, wherein each of said the sample compartments has have a volume of 100 nl - 1 ml each.

Claim 87 (Currently Amended) A device according to claim 7, wherein said, ~~at the side facing away from the optically transparent layer (a),~~ the sample compartments are closed at a side facing away from said first optically transparent layer except for inlet and outlet openings for the supply and/or removal, respectively, of samples and optional additional reagents, and wherein the supply or and removal of the samples and optional additional reagents is performed in a closed flow-through system, and wherein in case of a liquid is supplied to said measurement areas or segments with common inlet and outlet openings, said inlet and outlet openings are preferably addressed row by row or column by column.

Claim 88 (Currently Amended) A device according to claim 7, wherein the supply of the samples and optional additional reagents is performed in parallel or crossed micro channels, affected by pressure differences or by electric or by electromagnetic potentials.

Claim 89 (Currently Amended) A device according to claim 7, wherein said the sample compartments have openings for the locally addressed supply or removal of samples or other reagents reagents at a the side facing away from said first the optically transparent layer (a).

Claim 90 (Currently Amended) A device according to claim 7, wherein compartments are provided for reagents, which are wetted and brought into contact with said the measurement areas during an the assay.

Claim 91 (Currently Amended) A device according to claim 7, wherein said sensor platform has optically or mechanically recognizable marks are provided thereon on the sensor platform, the optically or mechanically recognizable marks at least one of facilitating in order to facilitate

~~the adjustment of said sensor platform in an optical system and facilitating and / or to facilitate the combination of said the sensor platform with said sealing the layer having said (g) comprising the recesses for said the sample compartments.~~

Claim 92 (Withdrawn - Currently Amended) An analytical system for determining the determination of one or more luminescences, the analytical system comprising:

- a. at least one excitation light source;
- b. a device according to claim 7; and
- c. at least one detector for recording emission the light emanating from the at least one of said or more measurement areas (d) on said the sensor platform.